

REMARKS

Applicant's invention is a novel method for providing refrigeration, particularly to superconducting equipment, using capillary pumped subcooled liquid which has been separately and sequentially condensed and subcooled by cryocooler generated refrigeration.

Claims 1 and 11 have been amended to more particularly point out and distinctly claim applicant's invention. More specifically claim 1 has been amended to more clearly recite the specific steps of condensing and then separately subcooling the working fluid using the cryocooler refrigeration, and providing the resulting working fluid to the evaporator located at a lower elevation. Support for the amendments to claim 1 is found in paragraph 26 and in Figure 1. Claim 11 has also been amended to more clearly recite the specific steps of condensing and then separately subcooling the working fluid using the cryocooler refrigeration, and then providing refrigeration to the refrigeration load using liquid immersion. Support for the amendments to claim 11 is found in paragraphs 32 and 33, and in Figure 4. Claims 3, 4, 5, 14 and 15 have been cancelled. It is respectfully submitted that the amendments made herein do not comprise new matter.

The Rejections

Claims 1-6 were rejected under 35 USC 103(a) as being unpatentable over Baker (U.S. 5,816,313) in view of Gamble et al. (U.S. 5,848,532); claims 7, 8 and 10 were rejected under 35 USC 103(a) as being unpatentable over Baker and Gamble et al. further in view of Vary (U.S. 3,490,718); claim 9 was rejected under 35 USC 103(a) as being unpatentable over Baker and Gamble et al. further in view of Liao et al. (U.S. 6,169,852); claims 11 and 13-16 were rejected under 35 USC 103(a) as being unpatentable over Baker and Gamble et al. further in view of Stark (U.S. 6,116,040); claims 12 and 19 were rejected under 35 USC 103(a) as being unpatentable over Baker, Gamble et al. and Stark further

in view of Liao et al.; and claims 17, 18 and 20 were rejected under 35 USC 103(a) as being unpatentable over Baker, Gamble et al. and Stark further in view of Vary. Each of these rejections is respectfully traversed.

Baker fails to teach or to suggest the separate and sequential cryocooler condensation and subcooling steps of applicant's claimed invention. Moreover, Baker fails to teach or to suggest the lower elevation of the evaporator from the heat exchanger of applicant's invention as recited in claim 1, or to recognize the advantages attainable thereby. Indeed Baker appears to teach just the opposite of this aspect of applicant's claimed method. Still further, Baker fails to teach or to suggest the liquid immersion heat exchange of applicant's invention as recited in claim 11, or to recognize the advantages attainable thereby. Again, Baker appears to teach just the opposite of this aspect of applicant's claimed method.

Substituting a cryocooler, such as the cryocooler of Gamble et al., for the generic heat extraction of Baker does nothing to overcome the deficiencies of Baker discussed above. Accordingly applicant respectfully submits that his claimed method is patentable over the combination of Baker and Gamble et al.


Stark specifies that the liquid refrigerant is evaporated while cooling electronic components. Thus Stark, like Baker, appears to teach away from the liquid immersion heat exchange of applicant's invention as recited in claim 11. Stark fails to add anything to the combination of Baker and Gamble et al., to overcome the deficiencies discussed above. Accordingly, applicant respectfully submits that his claimed invention is patentable over the combination of Baker, Gamble et al. and Stark.

Neither Vary nor Liao et al. add anything material to overcome the deficiencies of Baker, Gamble et al. and Stark discussed above. Accordingly, applicant respectfully submits that his claimed invention is patentable over Vary or Liao et al. each in combination with Baker and Gamble et al. or with Baker, Gamble et al. and Stark.

Applicant acknowledges the recitations of Abe (U.S. 3,638,447), Bizzell et al. (U.S. 4,470,450), Helt et al. (U.S. 4,720,981), Dowdy et al. (U.S. 4,957,157), Cullimore et al. (U.S. 5,103,897), Phillips et al. (U.S. 5,587,880), Van Oost (U.S. 5,944,092), Acharya et al. (U.S. 6,205,812), Bonaquist et al. (U.S. 6,374,617) and Bilski (U.S. 6,550,530) which were not applied against the claims. Suffice it to say that none of these references discloses or suggests applicant's claimed invention.

In view of the foregoing, it is respectfully requested that the application be reconsidered and that all of the pending claims be allowed.

Respectfully submitted,



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November 5, 2004
D-21350